

UNITED STATES OF AMERICA
DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
RENTON, WASHINGTON 98055-4056

In the matter of the petition of

Saab Aircraft AB

for an exemption from § 25.562(c)(5)
of the Federal Aviation Regulations

Regulatory Docket No. 27155

PARTIAL GRANT OF EXEMPTION

By letters RN 150037 dated March 15, 1995 and May 31, 1995, Mr. Bengt Hasselberg, Director, Airworthiness, Saab Aircraft AB, S-581 88 Linköping, Sweden, petitioned for an extension to Exemption 5623B regarding Head Injury Criterion (HIC) of § 25.562(c)(5) for passengers seated behind interior furnishings. The existing exemption expired on December 31, 1994, and a previous request for extension was denied (Exemption No. 5983) on the basis that no airplanes would have been affected by the exemption.

Sections of the FAR affected:

Section 25.562(c)(5), as amended by Amendment 25-64, requires that each occupant must be protected from serious head injury under the conditions prescribed in paragraph (b) of this section. Where head contact with seats or other structure can occur, protection must be provided so that the head impact does not exceed a HIC of 1,000 units. The level of HIC is defined by the equation:

$$HIC = \left[(t_2 - t_1) \left[\frac{1}{(t_2 - t_1)} \int_{t_1}^{t_2} a(t) dt \right]^{2.5} \right]_{\max}$$

ANM-95-028-E

Related Section of the FAR:

Section 25.785(a), as amended by Amendment 25-64, requires that each seat, berth, safety belt, harness, and adjacent part of the airplane at each station designated as occupiable during takeoff and landing must be designed so that a person making proper use of those facilities will not suffer serious injury in an emergency landing as a result of inertia forces specified in §§ 25.561 and 25.562. (Due to a non-substantive editorial change, these requirements are contained in § 25.785(a) and (b) of current Part 25.)

The petitioner's supportive information is as follows:

In previous petitions related to this issue, Saab has noted that the state of the art for galleys, closets and other interior furnishings does not provide compliance with the HIC requirement. After lengthy development work on energy absorbing pads, Saab ultimately concluded that these were not a viable option and began pursuing other possible means of compliance more aggressively.

Saab has continued to work with the supplier of their interior components, as well as other airframe manufacturers to evaluate and develop suitable means of compliance, but does not believe such means will be available for some time. The granting of an exemption will not impede such development, however. Saab feels that collaboration within the industry is essential to develop acceptable final solutions.

Saab also notes that the European Joint Aviation Authorities have granted an exemption until December 31, 1996.

The FAA finds, for good cause, that action on this petition should not be delayed by the publication and comment procedures for the following reasons: (1) a partial grant of exemption would not set a precedent in that it is for a time extension from a requirement, and not permanent relief from a requirement, and is similar to exemptions that have been granted previously, and (2) delay on acting on the petition would be disruptive and create a major economic burden on the petitioner and the operator.

The FAA's analysis/summary is as follows:

The FAA originally issued Exemption 5623 based on the lack of commercially available design solutions for compliance with the HIC requirement, for passengers seated behind interior furnishings ("front row" passengers). In issuing the exemption, the FAA established a date that would have allowed type certification of the airplane, but would have expired before the first such airplane was delivered to a US operator. Since then, the certification date has passed but there have not, as yet, been any deliveries to US operators. Exemption 5983 denied a subsequent request for extension on the basis that

no US operators would have been affected by the exemption, and it was therefore not in the public interest to grant the exemption. The technical merit of the petition did not enter into the decision to deny the exemption.

The FAA notes that Saab has been making a good faith effort to comply with the regulation, as noted in their progress reports submitted in accordance with Exemption 5623. Nonetheless, no design solution considered acceptable to the manufacturers and operators is yet available, although there is a system that shows good promise. The FAA also notes that no manufacturer has yet arrived at a design solution for front row HIC that will address every installation, that is, combination of seat arrangement and interior furnishing.

Design solutions that are available are either too costly, e.g., removal of seats to provide adequate clearance between the seat and interior feature, or not considered commercially viable, e.g., shoulder harnesses. This recognizes that the additional space required to provide clearance between the front row seat and interior feature is especially costly in smaller transport airplanes such as this, where a single row of seats is a significant portion of the total passenger capacity. Nonetheless, while the installation of upper torso restraints has not been technically developed to the point where such installations are ready for usage, there does not seem to be any technical barrier to such use. The perceived questions of commercial acceptance will not be an acceptable argument if no other design solution is forthcoming. The FAA does recognize that this would not be optimum however, and wants to encourage the development of systems that are both commercially acceptable and at the same provide maximum safety benefit.

In wishing to encourage development of an optimal solution, the FAA recognizes that it may be counterproductive to establish relatively short compliance dates which can actually inhibit development of optimal solutions in favor of those that appear to be easier to achieve. At the same time, this is an important safety benefit that should not be unduly delayed by protracted development and optimization programs, once the basic designs become viable. Up to now, the progress in development of front row HIC solutions has been steady, and is not moving into the realm of optimization of minutiae. In consideration of all of the above factors the FAA believes that a grant of exemption is warranted, and that the most benefit to the traveling public is likely to result by allowing sufficient time to develop more optimal solutions to the problem of front row HIC. In addition, relatively few airplanes will enter the US fleet while the exemption is in effect, which will reduce the number of airplanes requiring retrofit.

In consideration of the foregoing, I find that a Partial Grant of Exemption is in the public interest, and will not significantly affect the level of safety provided by the regulations. Therefore, pursuant to the authority contained in §§ 313(a) and 601(c) of the Federal Aviation Act of 1958, delegated to me by the Administrator (14 CFR 11.53), the petition of Saab Aircraft AB for exemption from the HIC requirements of §§ 25.562(c)(5) of the FAR, for "front row"

seats on SAAB 2000 airplanes, is granted until December 31, 1996. Other provisions of Exemption 5623, together with its conditions and limitations, remain the same and are applicable to this exemption. This amendment is part of, and shall remain attached to, Exemption 5623 remain valid.

Issued in Renton, Washington, on

Darrell M. Pederson
Acting Manager,
Transport Airplane Directorate,
Aircraft Certification Service, ANM-100

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